

CBUSE 18-3-7.3 VI

3/25/02

ATTACHMENT 4

**TO UNILATERAL ADMINISTRATIVE ORDER
FOR REMEDIAL DESIGN AND REMEDIAL ACTION**

Docket No. CERCLA 10-2002-0065

**HEAD OF HYLEBOS WATERWAY PROBLEM AREA
COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE
TACOMA, WASHINGTON**

USEPA SF



1314370

**STATEMENT OF WORK
FOR THE UNILATERAL ADMINISTRATIVE ORDER
REMEDIAL DESIGN, REMEDIAL ACTION & LONG-TERM MONITORING**

Docket No. CERCLA 10-2002-0065

**HEAD OF HYLEBOS WATERWAY PROBLEM AREA:
SEGMENTS 1 AND 2**

**COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE
TACOMA, WASHINGTON**

INDEX

- I. PURPOSE
- II. DESCRIPTION OF REMEDIAL ACTION
- III. PERFORMANCE STANDARDS
- IV. WORK TO BE PERFORMED BY RESPONDENTS
- V. RD/RA SCHEDULE OF DELIVERABLES AND MILESTONES

Table 1 Sediment Quality Objectives

Table 2 Biological Decision Criteria to be used in Hylebos Waterway RD/RA

Figure 1 Segments 1 and 2 of Hylebos Waterway, August 2000 ESD

I. PURPOSE

The purpose of this Statement of Work (SOW) is to set forth requirements for implementation of the remedial action that Respondents are required to perform under the Unilateral Administrative Order (UAO) for Remedial Design and Remedial Action, Docket No. CERCLA 10-2002-0065. This SOW addresses Segments 1 and 2 of the Hylebos Waterway (hereinafter collectively referred to as the "Head of Hylebos Waterway Problem Area", further described below). This SOW is consistent with the Record of Decision (ROD), signed by the Regional Administrator of the United States Environmental Protection Agency (EPA), Region 10 on September 30, 1989, for the Commencement Bay Nearshore/Tideflats (CB/NT) Superfund Site (CB/NT Site), and the Explanation of Significant Difference (ESD) dated July 28, 1997 and a separate ESD dated August 3, 2000 (2000 ESD). The 2000 ESD specifies the cleanup plan, various performance criteria and the disposal sites for the Hylebos Waterway Problem Areas, among other areas. The 1997 ESD modified the sediment cleanup standard for polychlorinated biphenyls (PCBs). This SOW is Attachment 4 to the above-referenced UAO.

The Head of Hylebos Waterway Problem Area, located within the Commencement Bay Nearshore/Tideflats (CB/NT) Superfund Site in Pierce County, Washington is shown on Figure 1 attached to this SOW. Using the delineation of Hylebos Waterway segments developed during the Hylebos Cleanup Committee's pre-remedial design activities, Segments 1 and 2 of the Hylebos Waterway are depicted in Figure 1 and include the Upper Turning Basin at the southernmost end of the waterway, extending through the neck of the waterway, and ending at the northernmost end of the lower turning basin, including the area designated SMA 221. This SOW does not include those portions of Segment 1 located in the Upper Turning Basin designated as Sediment Management Area (SMA)103 and 123, which are being addressed under UAO No. CERCLA 10-2002-0064 (Mouth of Hylebos Waterway Problem Area).

In conducting work specified in this SOW, Respondents shall follow: the 1989 ROD as modified by the 1997 and 2000 ESDs; approved pre-remedial design deliverables; this SOW; approved Remedial Design and Remedial Action Work Plans; and EPA Superfund Remedial Design and Remedial Action Guidance applicable to submitting deliverables for designing and implementing the remedial action at the Head of Hylebos Waterway Problem Area of the CB/NT Site.

Disposal sites for contaminated sediments were identified in the 2000 ESD which provide the Respondents with suitable locations for sediment waste disposal. This SOW, however, assumes that upland disposal at the Roosevelt Regional Landfill in eastern Washington will be utilized in the implementation of this SOW, because ATOFINA Chemicals, Inc., and General Metals of

Tacoma, Inc. have conducted two pilot studies to verify material handling characteristics, dredging methods, off-loading, and transport methods to the disposal site for cleanup at the Head of Hylebos Waterway Problem Area. These documents were previously submitted to EPA for consideration.

One objective in implementing the requirements of this SOW is to initiate work in the 2002 dredging season if feasible. In preparation of the Remedial Design Work Plan under this SOW, Respondents shall propose an implementation strategy that identifies work elements to be accomplished in 2002 or provide an explanation of the limitations to initiating remedial action in 2002.

If Respondents choose to use a disposal site other than the upland regional landfill assumed by this SOW, Respondents shall identify their intended disposal site in the RD Work Plan.

Implementation of this SOW shall result in achieving the CB/NT Site cleanup objectives including the Sediment Quality Objectives (SQOs).

II. DESCRIPTION OF REMEDIAL ACTION

A. Key Elements of CB/NT ROD

The CB/NT ROD selected a remedy comprised of five (5) key elements: site use restrictions (now commonly referred to as institutional controls), source control, natural recovery, sediment remedial action (i.e., confinement), and monitoring, to address contaminated sediments in the waterways of the CB/NT Site.

Four (4) of the five (5) primary elements of the CB/NT ROD will be implemented under this SOW: sediment remedial action (including habitat mitigation), natural recovery (including the potential for active sediment remediation if natural recovery does not occur as required), site use restrictions, and monitoring. Source control of ongoing sources of hazardous substances to the Hylebos Waterway problem areas is not an element of this SOW. The Washington State Department of Ecology (Ecology) has been designated as the lead agency for source control at the CB/NT Site. Ecology issued its Milestone 5 report, the final administrative milestone for source control, documenting completion of activities for Hylebos Waterway on June 14, 2000. Remaining source control actions are either being addressed by Ecology as source control actions, or as separate cleanup actions. Monitoring for source control effectiveness will be

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

implemented under this SOW to assist EPA in verifying source control effectiveness. Specific monitoring requirements will be set forth in the Operations, Maintenance, and Monitoring Plan (OMMP) described in Task 6 of Section IV of the SOW.

B. Cleanup Objectives

The cleanup objectives for the remedial action, as described in Section 10 of the 1989 ROD, state, "the selected remedy is to achieve acceptable sediment quality in a reasonable time frame" (CB/NT ROD, p. 97). Habitat function and enhancement of fisheries resources are also project cleanup objectives.

1. Acceptable Sediment Quality in a Reasonable Time Frame

"Acceptable sediment quality" is defined as "the absence of acute or chronic adverse effects on biological resources or significant human health risk" (CB/NT ROD, p.62). The 1989 ROD designated biological test requirements and associated sediment chemical concentrations referred to as sediment quality objectives (SQOs) to attain cleanup objectives for the CB/NT Site. The PCB SQO was subsequently updated in a 1997 ESD.

SQOs are performance standards for the CB/NT Site. Sediment quality objectives for individual chemicals specified in the ROD, as amended in the 1997 ESD, are provided in Table 1 to this SOW. In addition to the SQOs, Respondents may elect, with EPA approval, to perform biological toxicity tests for all chemicals except PCBs to demonstrate the absence of biological effects predicted by the SQOs. Toxicity testing may also be used to assess the suitability of sediments for open-water disposal when chemical data predict that biological effects might be present. Relevant biological test criteria are provided in Table 2 to this SOW.

A "reasonable time frame" incorporates the ROD's selection of natural recovery for sediments in the CB/NT Site that are minimally contaminated and are predicted to naturally recover within 10 years from implementation of the remedial action in any given problem area. The Pre-Remedial Design Evaluation Report identified a number of different potential natural recovery areas, including areas within the Head of Hylebos Waterway Problem Area. However, since these identified natural recovery areas overlap with subsurface chemistry, the Respondents may address some or all of these areas through active remediation rather than rely on natural recovery and long-term monitoring. Performance monitoring of natural recovery areas is a requirement of this SOW and is discussed in more detail in Section III.C below.

Except for natural recovery areas, the time frame for achieving SQOs shall be the end of construction of individual elements of the remedial action, as detailed in the Construction Quality Assurance Plan (CQAP) and OMMP, as appropriate, to be approved by EPA under this SOW. Determining whether SQOs have been achieved will be verified through a comparison with SQOs, and with a statistical comparison of performance monitoring data with SQOs, surrounding surface chemistry, and Sediment Remedial Action Levels (SRALs). The sediment quality monitoring and decision framework will be detailed in the OMMP.

2. Habitat Function and Enhancement of Fisheries Resources

Habitat function and enhancement of fisheries resources have also been incorporated as part of the overall project cleanup objectives. For example, the physical characteristics and placement of material used for capping contaminated sediments in the marine environment will be required to provide a suitable substrate and habitat for aquatic organisms that may utilize that environment. The exact scope and focus of these activities will be determined on a project-specific basis during remedial design. Consideration of habitat function and enhancement of fisheries resources is required under this SOW to meet cleanup objectives and comply with ARARs, including the Clean Water Act, Endangered Species Act, and the Puyallup Tribe of Indians Settlement Act of 1989.

C. Head of Hylebos Waterway Problem Area

The 1989 ROD and 2000 ESD specified confinement as a primary component of the sediment cleanup remedy, and identified in-place capping, natural recovery, and upland disposal as practicable options for portions of the Hylebos Waterway cleanup, including the Head of Hylebos Waterway Problem Area. In-place capping, which involves containment and isolation of contaminated sediment by placing clean material on top of existing substrate, may be used to remediate nearshore embankments in this area where removal is not practicable. Dredging will occur largely within open access areas of the waterway. Dredged sediment not suitable for open-water disposal must be disposed of in one of three disposal sites identified in the 2000 ESD. Based on previous pilot projects at the Head of Hylebos, this SOW assumes disposal of dredge material at the Roosevelt Regional Landfill in eastern Washington. The cleanup areas shown in Figure 1 and described in more detail in subsequent sections of this SOW, represent the cleanup plan of the 2000 ESD, which is subject to remedial design as approved by EPA and remedial action under EPA oversight under this SOW.

3. Head of Hylebos Waterway Problem Area Open Access Dredge Areas

Previous investigations and preliminary engineering evaluations of the Head of Hylebos Waterway Problem Area are contained in the Hylebos Waterway Pre-Remedial Design Evaluation Report (PRDE Report), approved by EPA in November 1999. Consistent with the PRDE Report and the 2000 ESD, sediment requiring confined disposal shall be dredged and disposed of in one of the three selected disposal sites. Areas to be dredged are shown in Figure 1. Wherever practicable, sediment will be dredged to below the native sediment interface, if conventional dredging equipment is used. Performance monitoring will be undertaken, and additional dredging completed as necessary, to ensure removal of sediment exceeding applicable SQOs. Dredging and performance monitoring requirements are described in Section III.B below, and shall be detailed in the CQAP and OMMP, as appropriate.

Respondents may propose the use of precision dredging techniques under this SOW, in lieu of conventional dredging techniques. Because precision dredging techniques were not evaluated in the PRDE, EPA may allow for modifications to performance monitoring requirements that could not be anticipated when the PRDE and 2000 ESD were completed. A rationale shall be required in appropriate remedial design deliverables for EPA review and approval under this SOW to justify any proposed changes to the performance standards in Section III.B or elsewhere. Consideration by EPA of proposed modifications to any performance standard will take into account the proposal's site-specific factors, technical merits, as well as EPA policy.

4. Embankment Cleanups

The embankment areas to be addressed in the Head of Hylebos Waterway Problem Area under this SOW include:

- a) Atofina dock/structure (SMA 231)
- b) Dunlap intertidal (SMA 242)
- c) Weyerhaeuser natural recovery area (SMA 102)
- d) J&G Investments intertidal (SMA 142)
- e) Ace Tank intertidal (SMA 121)
- f) General Metals graving dock natural recovery area (SMA 203)
- g) Hylebos Boat Haven dock/structure (233)

Respondents shall perform the embankment cleanup actions required under this SOW to ensure that performance standards are achieved for these areas of the Hylebos Waterway. To the extent that individual property owners request design elements not covered by this SOW, the time lines and coordination for the embankment cleanup with respect to items outside the scope of this

SOW shall be identified in the RA Work Plans and addressed in other deliverables as necessary to ensure the sediment remedial action is conducted in compliance with this SOW and the remedial action schedule.

The appropriate remedial action (capping or dredging) for the embankment actions described above will be evaluated in the remedial design deliverables submitted under this SOW.

5. Natural Recovery Areas

Natural recovery has been selected for specific portions (see Figure 1) of the Hylebos Waterway as an acceptable remediation approach at locations where sediments are marginally contaminated, are likely to recover to SQOs within the ten (10) year time frame specified in the ROD, and are located in areas with a low potential for future exposure of subsurface contamination. At the CB/NT Site, EPA considers marginally contaminated sediments as those with chemical concentrations less than the second lowest Apparent Effects Threshold (AET) value (the SQO is set at the lowest AET) or biological test results that do not exceed the minimum cleanup level (MCUL) values under Washington State Sediment Management Standards (SMS). Numeric AET chemical concentration values are those specified in the 1989 ROD, while biological MCUL criteria are those specified in SMS regulations. Where PCBs are present, marginally contaminated sediments are those with PCB concentrations below 450 ppb as identified in the 2000 ESD.

Respondents will monitor designated natural recovery areas to verify compliance with performance monitoring criteria summarized in Table 1 (including optional biological monitoring; see Table 2). If future monitoring data indicate that natural recovery will not or does not occur within the next 10 years, the need for enhanced natural recovery and/or active sediment remediation will be reassessed with EPA, consistent with the 2000 ESD. The scope of long-term monitoring and appropriate response actions will be established in the OMMP.

The PRDE Report also predicted that several areas within Segments 1 and 2 would naturally recover within the 10 years following active remediation of the adjacent waterway. Performance monitoring will be performed to verify compliance with criteria summarized in Table 1 (including optional biological monitoring; see Table 2). If monitoring data indicate that natural recovery will not or does not occur within the next 10 years, the need for enhanced natural recovery and/or active sediment remediation will be reassessed by the Respondents and EPA, consistent with the 2000 ESD. The scope of long-term monitoring and appropriate response actions will be established in the OMMP.

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

As part of remedial design, Respondents may choose to address natural recovery areas through active remediation rather than rely on natural recovery and the performance monitoring required for natural recovery.

D. Coordination with Wood Debris Group Cleanup

EPA has identified three SMAs in the Upper Turning Basin: Weyerhaeuser natural recovery area (SMA 102), J&G Investments intertidal area (SMA 142), and Manke Lumber natural recovery area (SMA 101) which are designated by EPA in the 2000 ESD as requiring remedial action. These areas are in close proximity to a cleanup being conducted under the Washington State's Model Toxics Control Act. This cleanup effort is commonly referred to as the Wood Debris Group Cleanup. Under this SOW, Respondents shall coordinate with members of the Wood Debris Group and the Washington State Department of Ecology regarding the timing of actions under this SOW and the schedule for Wood Debris Group cleanup actions.

III. PERFORMANCE STANDARDS

The Respondents shall adhere to the following performance standards for the design and implementation of the Head of Hylebos Waterway Problem Area RD/RA. These performance standards, as stated in the 2000 ESD, or elsewhere, are consistent with the cleanup objectives and are necessary to ensure that the remedy is protective of human health and the environment, and complies with Applicable or Relevant and Appropriate Requirements (ARARs). Performance standards shall include cleanup standards, standards of control, quality criteria, and other substantive requirements, criteria, or limitations including all ARARs set forth in the 1989 ROD, 1997 and 2000 ESDs, this SOW, and/or UAO, and approved deliverables under this SOW. Respondents shall address these performance standards in remedial design and shall identify additional performance standards and methods necessary to successfully implement the remedial action, including performance standards to monitor the long-term effectiveness of the remedial action and mitigation areas.

A. Cap Requirements

One of the remedial actions selected in the 1989 ROD and included in the preliminary cleanup plans for the Hylebos Waterway is capping. Respondents shall follow EPA guidance, "Guidance for *In-situ* Subaqueous Capping of Contaminated Sediments," September 1998, Reference EPA 905-B6-004, for the design and construction of capped areas.

In the remedial design, Respondents shall evaluate each embankment SMA on a property-by-property basis to identify a final design, either capping or dredging. For each property, Respondents' basis for design shall address the following factors:

- protectiveness of the proposed cap,
- compatibility with current and anticipated future land use,
- property owner's willingness to implement use restrictions on the capped area and/or ensure such restrictions will run with the land,
- engineering constraints, and
- avoidance and/or minimization of habitat impacts and identification of appropriate mitigation under CWA Section 404, and compliance with Endangered Species Act measures that may be identified.

EPA intends to maintain the integrity and effectiveness of any capped area over contaminated sediments through requirements for construction, long-term monitoring, and maintenance, including the following:

2. Caps will have a minimum thickness of three (3) feet unless an alternative thickness is demonstrated to be consistent with "Guidance for *In-situ* Subaqueous Capping of Contaminated Sediments," and/or otherwise approved by EPA. Caps will be constructed to address adverse impacts through four primary functions:
 - a. Physical isolation of the contaminated sediment from the ecological receptors;
 - b. Complete confinement and stabilization of contaminated sediments, preventing resuspension and transport to other locations within the waterway;
 - c. Reduction of chemicals transported through the groundwater pathway to levels that will not impact surface sediments (defined as the "biologically active zone" where most sediment-dwelling organisms live) above the SQOs, and will not impact surface water at levels exceeding background concentrations or marine chronic water quality criteria;
 - d. Provide a cap surface that promotes colonization by aquatic organisms, unless it is demonstrated not to be practicable.
3. Long-term monitoring of the cap may include visual inspection, bathymetric survey, sediment deposition monitoring, chemical monitoring, and biological monitoring. The monitoring requirements will be specified in the OMMP.

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

Respondents shall demonstrate that all capped areas are completed in accordance with these performance standards. The methods for achieving the objectives for the capped areas shall be set forth in the Design Report. Verification of performance standards shall be documented in the CQAP and the OMMP, as appropriate. As-builts shall be provided for each capped SMA in the Remedial Action Construction Report.

B. Dredging and Disposal

Performance standards for dredging shall be consistent with the CB/NT ROD and ARARs including the Clean Water Act, Rivers and Harbors Act, and Endangered Species Act requirements. Under this SOW, the Head of Hylebos Waterway Problem Area will be subject to construction quality assurance and long-term monitoring to ensure that the selected remedy remains protective, and that applicable water quality standards are not exceeded beyond the surface water mixing zone identified for in-water activities (e.g., capping & dredging).

Section 401 of the Clean Water Act requires that both dredging and dredged material disposal (including dewatering) operations shall not violate applicable effluent or water quality standards. EPA, working with Ecology, will be responsible for certifying during remedial design that such operations will comply with this requirement. This determination allows for the designation of mixing zones within which standards may be exceeded, but beyond which applicable standards must be met. While dredging and disposal operations conducted as part of a remedial action within a CB/NT problem area do not require a formal Section 401 water quality certification from Ecology, these operations must comply with the substantive requirements of such certification, including specified monitoring and reporting requirements identified by EPA.

The mixing zone utilized during dredging actions and upland disposal (including temporary discharge of dewatering fluids as necessary), will require a water-quality certification from EPA. Respondents shall submit water quality monitoring plans as part of this SOW.

Respondents shall design and implement the dredging of designated Sediment Management Areas necessary to achieve SQO cleanup levels in those areas EPA has determined will not naturally recover within 10 years. Wherever practicable, sediment will be dredged to below the native sediment interface. Performance monitoring will be undertaken, and additional dredging completed as necessary, as detailed in the CQAP to be approved by EPA. The need for additional dredging will be determined based on a comparison with SQOs, and with a statistical

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

comparison of performance monitoring data with SQOs, surrounding surface chemistry, and SRALs. The sediment quality monitoring and decision framework for long-term effectiveness will be detailed in the OMMP.

Contaminated sediment will be dredged and disposed of in an upland regional landfill that is authorized to accept the material. As-builts of all dredged surfaces shall be provided to EPA in the Remedial Action Construction Report. Respondents shall document to EPA quantities (in-place volumes), and disposal location (upland regional landfill) for each SMA dredged from the Head of Hylebos Waterway Problem Area.

The methods for achieving the objectives for dredged areas and disposal Sites addressed under this SOW shall be set forth in the Design Report, the CQAP and the OMMP, as appropriate. Verification that performance standards, including SQOs, have been achieved shall be documented in the pre-final construction reports, and the Remedial Action Completion Report, as appropriate.

C. Natural Recovery

For those areas selected for natural recovery, Respondents shall prepare: (1) monitoring plans, (2) identify triggers for initiating additional response actions if the monitoring indicates natural recovery will not succeed in the ten (10) year time frame, and (3) specify additional response actions for active remediation if monitoring indicates natural recovery will not occur by year ten (10). These elements shall be primarily addressed in the OMMP for the Site and other deliverables, as appropriate. Natural recovery monitoring will be performed until cleanup objectives are achieved.

D. Subsurface Contamination

The cleanup plan for the Head of Hylebos Waterway Problem Area included in this SOW (Figure 1) includes all areas of subsurface contamination that EPA determined had a high to moderate potential for future exposure. Contaminated subsurface sediments that EPA determined had a low potential for exposure will require long-term monitoring under this SOW. Because exposure of contaminated subsurface sediments may occur during the cleanup by dredging adjacent areas, under this SOW, Respondents shall prepare a final remedial design and implement the remedial action to ensure that contaminated subsurface sediment is not exposed and that SQOs are achieved at the surface of every dredge cut. Where EPA determines it is not practicable to achieve SQOs at the face of a dredge cut, Enhanced Natural Recovery or alternatives other than dredging may be proposed by Respondents.

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

Because exposure of contaminated subsurface sediments may occur after construction of the remedial action through physical processes, such as storms or ship scour, or through future dredging or excavation, under this SOW Respondents shall conduct long-term monitoring in these areas as set forth in an approved OMMP. This element of long-term monitoring shall be designed, in part, to detect recontamination from buried subsurface contamination.

E. Conservation Measures and Compensatory Mitigation

Respondents shall take all appropriate measures during remedial design, construction, and site maintenance to avoid and minimize adverse impacts to the aquatic environment resulting from implementation of the remedial action. As set forth in the CB/NT Biological Assessment (BA) prepared by EPA, and in the 2000 ESD, a range of conservation measures are required by EPA to ensure that critical habitat for listed species is protected by the remedial action. Conservation measures for work in the Head of Hylebos Waterway Problem Area include:

- Design of capping actions to avoid conversion of aquatic habitat to upland in the Head of Hylebos Waterway Problem Area, or inclusion of compensatory mitigation measures if conversion is unavoidable;
- Design of dredging and capping actions to avoid conversion of intertidal habitat to subtidal habitat in the Head of Hylebos Waterway Problem Area, or inclusion of compensatory mitigation measures if conversion is unavoidable;
- Timing restrictions for in-water work to avoid fish-critical activity periods, such that no in-water work will occur during designated fish windows;
- Substantive compliance with water quality standards as specified in a water quality certification to be issued by EPA;
- Addition of select substrates (fish mix) as part of capping to assist in providing suitable habitat for prey items of juvenile salmonids; and
- Incorporation of specific measures (e.g., Best Management Practices) into the design, to reduce the potential for construction-related impacts to listed species or their habitats. Specific design measures will be reviewed and approved by EPA.

As part of remedial design under this SOW, Respondents shall prepare Addenda to the CB/NT BA, which shall incorporate additional design information. Additional conservation measures beyond those identified by EPA in the CB/NT BA (July 2000) may be identified by EPA in consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service and shall be incorporated into the final design documents under this SOW.

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

Section 404 of the Clean Water Act requires compensatory mitigation for unavoidable loss of wetlands and aquatic habitat. To the extent that conversion of aquatic habitat to upland, or intertidal habitat to subtidal habitat is unavoidable within the Head of Hylebos Waterway Problem Area, and that compensatory mitigation is determined to be necessary, Respondents shall submit compensatory mitigation plans to offset unavoidable losses to aquatic habitat. Compensatory mitigation shall contribute toward the recovery of ESA-listed species, consistent with the conservation measures in the BA and the August 2000 ESD performance standards for mitigation.

IV. WORK TO BE PERFORMED BY RESPONDENTS

The scope of work for this remedial design and remedial action includes the following key components (assuming upland disposal):

- Design and implement remedial actions in Segments 1 and 2 of the Head of Hylebos Waterway Problem Area
- Design and construct embankment actions in Segments 1 and 2, either capping or dredging
- Design and dredging of open access areas in Segments 1 and 2 and transport dredged material to a disposal site identified in the 2000 ESD
- Perform construction monitoring, and long-term monitoring, including but not limited to natural recovery monitoring and mitigation monitoring, as appropriate, and other objectives specified in OMMP Task 6
- Design and construct habitat mitigation, as necessary based on final design
- Coordinate remedial actions in the Upper Turning Basin with Ecology and Wood Debris Group cleanup as necessary to address SMAs under this SOW.

To accomplish this scope of work the remedial design/remedial action shall consist of the following five (5) tasks. Respondents shall be responsible for implementing additional work elements necessary for successful implementation of the Head of Hylebos Waterway Problem Area remedial action. All plans are subject to EPA approval.

Task 1: Remedial Design Work Plan
Task 2: Remedial Design

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

- A. Preliminary (30%) Design
- B. Draft (90%) Design
- C. Final (100%) Design

Task 3: Remedial Action Work Plan

Task 4: Remedial Action/Construction

- A. Pre-construction Inspection/Meeting
- B. RA Progress Meetings
- C. Pre-final Construction Inspection
- D. Final Construction Inspection
- E. Reports
 - 1. Remedial Action Construction Report
 - 2. Final Remedial Action Report

Task 5: Performance Monitoring and Construction Quality Assurance

Task 6: Long-term Operation, Maintenance & Monitoring

Additional details on each task are provided below. All documents, including work plans, reports, and memoranda, listed in Section V of this SOW are subject to EPA review and approval. Unless otherwise agreed by EPA and Respondents, a draft version of each document shall be submitted to EPA for review and comment. Subject to and in accordance with Section XIV of the UAO, upon receipt of EPA's comments on a draft document, the Respondents shall submit to EPA a revised final document that incorporates EPA's modifications or summarizes and addresses EPA's concerns. All deliverables submitted in response to EPA's comments shall include a transmittal that responds directly to each comment, and identifies how the comment was addressed in the deliverable. This SOW also specifies submittal of certain documentation (e.g., construction progress reports, monthly progress reports) that will be used by EPA for informational purposes only but will not be formally approved by EPA.

Respondents may submit separate remedial design deliverables for discrete elements of the remedial action, subject to EPA approval. The following shall be considered discrete elements of the remedial action under this SOW for purposes of submitting separate design deliverables; dredging of a Sediment Management Area (SMA) or segregable group of SMAs comprising a portion of the waterway, or an intertidal cleanup. Where practicable, multiple elements of the remedial action will be combined in the design deliverables. In any event, the deliverables will include a discussion of the interrelationships between discrete design elements.

Task 1: Remedial Design Work Plan

Within fifteen (15) days after the effective date of the UAO, Respondents shall submit a Remedial Design Work Plan in accordance Section IX. A. of the UAO and Section V (Schedule of Milestones and Deliverables) of this SOW. The RD Work Plan shall summarize the overall management strategy for performing the design, construction, operation, maintenance, and monitoring of remedial actions for EPA to review and approval. The plan shall document the responsibility and authority of all organizations and key personnel involved with the implementation and shall include a description of qualifications of key personnel directing the remedial design, including contractor personnel. Contact information (addresses, phone numbers, and e-mail) and general responsibilities for key personnel shall be provided. The Work Plan shall also contain a schedule of remedial design activities.

In addition to describing the overall management strategy and identifying additional data needs, Respondents shall make all reasonable efforts to communicate to the public and business community and coordinate work under this SOW to minimize disruption of normal use of the Hylebos Waterway and adjacent project areas. In the RD Work Plan, Respondents shall address scheduling and coordination of work under this SOW with other in-water work or navigation near the project area that may occur (e.g, Wood Debris Group cleanup). Respondents shall identify any known development projects anticipated on or near intertidal properties that are subject to work under this SOW.

One objective in implementing the requirements of this SOW is to initiate remedial action in the 2002 dredging season if feasible. In preparation of the Remedial Design Work Plan under this SOW, Respondents shall propose an implementation strategy that identifies remedial action elements to be accomplished in 2002 or provide an explanation of the limitations to initiating remedial action in 2002. If Respondents determine that work can reasonably be initiated in 2002, Respondents may propose in the RD Work Plan that the 30% preliminary design deliverable be eliminated to allow for an earlier construction start. EPA assumes Respondents will choose upland regional landfill as the disposal site for Segments 1 and 2. Respondents shall identify their intended disposal site in the RD Work Plan.

Task 2: Remedial Design

The remedial design is generally defined as those activities to be undertaken to develop the final plans and specifications, general provisions, special requirements, and all other technical and procurement documentation necessary to fully implement the remedial action as described in the

CB/NT ROD and this SOW. Respondents shall prepare construction plans and specifications to implement the remedial actions within the Head of the Hylebos Waterway Problem Area as described in the ROD and this SOW. Plans and specifications shall be submitted in accordance with the schedule set forth in Section V below. Subject to approval by EPA, Respondents may submit more than one set of design submittals reflecting different components of the remedial action. All remedial design work, including plans and specifications, shall be developed in accordance with EPA's Superfund Remedial Design and Remedial Action Guidance (OSWER Directive No. 9355.0-4A) and shall demonstrate that the remedial action shall meet all objectives of the ROD, CD, and this SOW, including all performance standards. Respondents shall meet regularly with EPA to discuss design issues.

A. Segments 1 and 2 Preliminary (30%) Design Deliverable

Within one hundred (100) days after the effective date of the UAO, Respondents shall submit the Segment 1 and 2 Preliminary (30%) Design Deliverable, in accordance with the UAO and Section V (RD/RA Schedule of Deliverables & Milestones) of this SOW. The Draft Segment 1 and 2 Preliminary Design Deliverable will present, for EPA review and approval, the results of remedial design sampling and analysis, and a preliminary dredge plan for identified action areas (SMAs) within Segments 1 and 2, as set forth in the 2000 ESD.

B. Draft (90%) Final Design

Respondents shall submit the Draft Final Design Report when the design effort is approximately ninety (90) percent complete. Within sixty (60) days after receipt of EPA's comments on the preliminary (30%) design, Respondents shall submit a Draft (90%) Design Report for discrete elements of Segment 1 and 2 remedial actions. The Draft Design submittals shall include or discuss, at a minimum, the following:

1. Summary of results of pre-design field sampling. Extensive pre-remedial design sampling was completed within the Head of Hylebos Waterway Problem Area from 1993 through 2001. The Draft Design Report shall include a brief summary of the work completed, identifying key documents, and summarizing key conclusions and sampling results. The summary and key conclusions shall clearly distinguish between data/interpretations previously approved by EPA and new data (post-1999) presented for EPA review and approval;

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

2. Basis for Design Report, with detailed design assumptions, parameters, design restrictions and objectives, including but not limited to:

General Elements:

- a. descriptions of the analyses conducted to select the design approach, including a summary and detailed justification of design assumptions;
- b. order in which dredging and capping will occur, addressed by Sediment Management Area;
- c. technical parameters and essential supporting calculations (at least one sample calculation presented for each significant or unique design calculation) upon which the design will be based, including but not limited to design requirements for each active remedy (e.g., dredging, capping);
- d. access and easement requirements, including an evaluation of the most appropriate Waterway Problem Area use restrictions for each element of the remedial action to ensure long-term effectiveness;
- e. coordination with other in-water work or navigation and commerce;
- f. permit requirements or substantive requirements of permits;
- g. preliminary construction schedule, including contracting strategy;
- h. plans and protocols for capping or dredging around pilings, piers, and other structures;

Capping Elements:

- i. appropriate physical and chemical characteristics of materials to be used for sediment capping;
- j. method for identifying and testing clean source material, including acceptance criteria for such sediment;
- k. cap placement techniques;
- l. determinations regarding potential propeller-driven erosion for capped area;
- m. selection of cap material suitable for colonization by aquatic organisms;
- n. Performance standards in Section III of this SOW;

Dredging Elements:

- o. methods and requirements for how dredged sediments will be handled, transported, and disposed;

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

- p. proposed staging, material handling, or dewatering location(s) required;
 - q. design dredge depth and overcut allowances;
 - r. dredged material volumes;
 - s. dredging techniques;
 - t. analysis of dredge cuts to ensure contaminated side slope do not remain exposed after dredging;
 - u. if appropriate, method and location for dewatering dredged sediments and disposal of associated water;
 - v. Performance standards in Section III of this SOW.
3. Complete set of drawings and specifications defining the detailed design;
4. Draft CQAP, including description/outline of proposed cleanup verification methods for remedial action construction (e.g., inspection activities and survey requirements), including compliance with ARARs. The CQAP shall also describe contractor/subcontractor qualifications, documentation and reporting, and various remedial action construction elements (e.g., dredging, capping, and fish salvage and protection). The CQAP will also describe water quality control measures to be specified in a Water Quality Monitoring Plan (e.g., inspection and oversight), that will occur during water quality monitoring activities to confirm that such activities are conducted consistent with requirements to be specified in the plans and specifications;
- a. Water Quality Monitoring Plan. The plan shall include the following minimum elements: monitoring schedule, sampling locations, intervals, parameters, analytical methods, key contacts, reporting requirements (including daily reports), daily contacts for notifications of all exceedances, result summaries, and draft and final reports.
5. Addendum to EPA's "Biological Assessment, Commencement Bay/Nearshore Tidelands Superfund Site," July 2000, addressing the performance standards in Section III.E., evaluating:
- a. Net changes to intertidal and shallow subtidal habitat resulting from final dredging and capping designs in the Head of Hylebos Waterway Problem Area and identifying the need for mitigation

of unavoidable impacts. If mitigation is necessary, a compensatory mitigation plan shall be submitted to EPA that also addresses the performance criteria in Section III.E. The Biological Assessment shall identify the proposed mitigation project for EPA approval;

6. Draft Compensatory Mitigation Plan. Respondents shall submit a compensatory mitigation plan including design drawings and details. The mitigation plan shall address the performance criteria in Section III.E.
7. Draft Operation, Maintenance, & Monitoring Plan (OMMP) (See Task 6);
8. Capital and Operation and Maintenance Cost Estimate (accuracy of +15 percent and -10 percent). This cost estimate shall refine the Pre-Remedial Design cost estimate to reflect the detail presented in the Draft Design;
9. Project Schedule for the construction and implementation of the remedial action that identifies timing for initiation and completion of all critical path tasks. This schedule shall incorporate construction sequencing considerations between this SOW and the Area 5106 removal action and the Occidental embankment area removal action.

C. Final (100%) Design

Within forty-five (45) days of receipt of EPA's comments on the draft (90%) design, Respondents shall submit the Final Design that is one hundred (100) percent complete. The Final Design shall fully address all comments made to the Draft (90%) Design and shall include reproducible drawings and specifications suitable for bid advertisement. The final project schedule submitted as part of the Final Design shall include specific dates for major milestones and completion of the project. As described in Task 3 below, certain elements of the design will be finalized as part of the subsequent Remedial Action Work Plan deliverable.

The project plans and specifications included with the Final Design shall include detailed descriptions of sampling activities, such as water quality performance sampling. The requirements for quality assurance sampling activities including the sampling protocols, sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation will be described. The CQAP will address inspections, surveys, oversight and reporting as

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

described above in Task 1, B.4. Detailed procedures for sediment and water quality sampling and analysis (post-dredge confirmatory and long-term) shall be presented in the OMMP. The OMMP shall include sediment sampling operations manual, quality assurance project plans, and health and safety plans for sediment sampling activities. Existing EPA-approved (HCC) Quality Assurance Project Plans (QAPPs) and other EPA-approved supporting documents may be referenced or included as appropriate.

Task 3: Remedial Action Work Plan

The Respondents shall submit a single Remedial Action Work Plan which includes a detailed description of all remediation and construction activities, including how those construction activities are to be implemented by Respondents and coordinated with EPA (e.g., site-monitoring, material staging and handling). When describing implementation of the remedial action, Respondents shall identify discrete elements of the remedial action for purposes of monitoring construction activities as they occur. The following shall be considered the limit of discrete elements of the remedial action under this SOW: a specific embankment SMA; dredging of a SMA or segregable group of SMAs comprising a portion of the waterway. The RA Work Plan shall include a project schedule for each major activity and submission of deliverables generated during the remedial action. The project schedule submitted in the RA Work Plan shall clearly describe the interrelationship between various discrete portions of the remedial and removal actions within this SOW. The Respondents shall submit a Remedial Action Work Plan in accordance with Section IX. B of the UAO and Section V of this SOW.

Respondents shall submit the following deliverables with submission of the Remedial Action Work Plan (unless previously submitted and approved by EPA):

1. Final Construction Quality Assurance Plan (see Task 5 for detail);
2. Final Contractor submittals (e.g., Water Quality Monitoring Plan, Health and Safety Plan and Quality Assurance Project Plan addenda as appropriate) for remedial action construction activities;
3. Final OMMP (see Task 6).

Task 4: Remedial Action Construction

The Respondents shall implement the remedial action as detailed in the approved Final Design and Final Remedial Action Work Plan. The following activities shall be completed in constructing the remedial action.

A. Preconstruction Inspection and Meeting

The Respondents shall participate with EPA and the State in a preconstruction inspection and meeting to:

1. Review methods for documenting and reporting inspection data, and compliance with specifications and plans including methods for processing design changes and securing EPA review and approval of such changes as necessary;
2. Review methods for distributing and storing documents and reports;
3. Review work area security and safety protocol;
4. Demonstrate the construction management is in place, and discuss any appropriate modifications of the construction quality assurance plan to ensure that Site-specific considerations are addressed; and
5. Conduct a Site walk-about to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

All inspections and meetings shall be documented by Respondent's designated contact and minutes shall be transmitted to all parties within seven (7) working days of the inspection or meeting.

B. RA Briefings and Progress Meetings

Respondents shall conduct RA briefings and progress meetings on a regular basis throughout the RA. Briefings shall be held on a weekly basis to discuss issues such as the results of ongoing water quality monitoring and field changes unless EPA and Respondents agree to a less frequent

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

schedule. Progress meetings shall be held at least monthly unless EPA and Respondents agree to a less frequent schedule. Progress meetings shall be scheduled on the same day that weekly briefings occur, thus eliminating the need for additional briefings during that week. At a minimum, Respondents shall address the following at progress meetings:

- General progress of construction with respect to RA schedule;
- Problems encountered and associated action items;
- Pending design, personnel or schedule changes requiring EPA review and approval;
- Results of any RA verification sampling and associated decisions and action items.

C. Prefinal Construction Inspections

Within thirty (30) days after Respondents make preliminary determinations that construction is complete for each discrete element of the remedial action, as defined in the Final Remedial Action Work Plan, the Respondents shall notify EPA and the State for the purposes of conducting a prefinal inspection.

The prefinal inspections shall consist of a walk-through inspection of the entire completed remedial action element with EPA. The inspection is to determine whether the project element is complete and consistent with the contract documents and the Remedial Action Work Plan, to review compliance with the CQAP, and to review field changes and change orders, and verify that SQOs have been achieved. The Respondents shall certify that each discrete element of the remedy has been constructed to meet the purpose and intent of the specifications. Respondents shall complete re-testing where deficiencies are revealed. Within seven (7) days of the inspection, a prefinal construction inspection letter/report shall be submitted to EPA. The prefinal construction inspection report shall include a summary of the major CQAP results and field changes, as well as minutes from the inspection. The prefinal inspection report shall outline the outstanding construction items, actions required to resolve items, completion date for these items, and a proposed date for final inspection, and otherwise comply with Section IX of the UAO.

D. Final Construction Inspections

Within thirty (30) days after completion of any work identified in the prefinal inspection reports, the Respondents shall notify EPA and the State for the purposes of conducting a final inspection of each discrete remedial action element. The final inspection shall consist of a walk-through inspection of each discrete element of the remedial action by EPA and the Respondents. The prefinal inspection reports shall be used as a checklist with the final inspection focusing on the

outstanding construction items identified in the prefinal inspections. Confirmation shall be made that outstanding items have been resolved. Resolution of all outstanding items should be documented in a Final Construction Letter/Report within thirty (30) days of the final inspection, which complies with Section IX of the UAO.

E. Reports

Respondents shall follow EPA guidance for preparing Remedial Action Reports described in "Close Out Procedures for National Priorities List Sites," EPA 540-R-98-016, OSWER Directive 9320.2-09A-P, PB98-963223, January 2000 in submitting the following reports.

1. Remedial Action Construction Report

The Respondents shall submit this report when the construction is complete for all discrete remedial action elements, but before all performance standards have been attained (i.e., prior to achieving natural recovery and long-term performance standards for mitigation).

Within thirty (30) days of the last successful final construction inspection, Respondents shall submit a Remedial Action Construction Report. In the report, a registered professional engineer and the Respondents' Project Coordinator shall state that the remedial action has been constructed in accordance with the design and specifications. The written report shall include as-built drawings signed and stamped by a professional engineer, and other supporting documentation to demonstrate the CQAP was followed. The report shall contain the following statement, signed by a responsible corporate official of the Respondents' Project Coordinator:

"To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

2. Remedial Action Completion Report

The Respondents shall submit this report after construction is complete and all performance standards have been attained (including performance standards for natural recovery and mitigation areas, as applicable), but where OMMP requirements will continue to be performed.

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

Within thirty (30) days of a successful demonstration that all performance standards have been attained, Respondents shall submit a Remedial Action Completion Report. In the report, a registered professional engineer and a responsible corporate official or the Respondents' Project Coordinator shall state the remedial action has been completed in full satisfaction of the requirements of the UAO. The written report shall include a summary of all information (e.g., long-term monitoring data) demonstrating performance standards not met (e.g., natural recovery) in the Remedial Action Construction Report have been obtained. The report shall also include documentation not previously submitted with the Remedial Action Construction Report verifying that performance standards, including SQO cleanup objectives, have been attained. The report shall contain the following statement, signed by a responsible corporate official of or the Respondents' Project Coordinator:

"To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Task 5: Performance Monitoring and Construction Quality Assurance

Performance monitoring shall be conducted to ensure that all performance standards are met, including cleanup verification methods and methods for determining compliance with performance standards and ARARs. The CQAP shall address performance standards related to the remedial action construction (e.g., inspections, surveys, oversight and reporting as described above in Task 1, B.4). Other confirmatory sediment sampling to demonstrate long-term achievement of SQOs throughout the Head of the Hylebos Waterway Problem Area and other long-term performance standards to be achieved after remedial action construction is completed (e.g., achievement of SQOs in natural recovery areas) shall be addressed in the OMMP. The post-construction sediment sampling results conducted under the CQAP will become the baseline for the OMMP described in Task 5. Existing EPA-approved (HCC) QAPPs and other supporting documents may be referenced as appropriate.

The documents listed in this section must be prepared and submitted consistent with in Section III of this SOW. The required content of each of these documents is described below.

A. Construction Quality Assurance Plan

Respondents shall submit in accordance with the schedule in section V of this SOW, a Construction Quality Assurance Plan (CQAP) that describes the specific components of the performance methods and quality assurance program that shall ensure that the completed project meets or exceeds performance standards and design criteria, and the project plans and specifications, including achievement of SQOs as defined in this SOW. As part of the CQAP, Respondents shall propose a sampling approach for verifying that SQOs have been achieved in Segments 3, 4, and 5. The draft CQAP shall be submitted with the Draft (90%) Design Report and the final CQAP shall be submitted with the RA Work Plan. Consistent with preparation of discrete elements of the remedial design, Respondents may submit more than one CQAP for discrete portions of the remedial action to facilitate contracting the remedial and removal actions under this SOW. The CQAP(s) shall contain, at a minimum, the following elements:

1. Responsibilities and authorities of all organizations and key personnel involved in the design and construction of the remedial action, including EPA and other agencies.
2. Qualifications of the Construction Quality Assurance (CQA) Official. Establish the minimum training and experience of the CQA Officer and supporting inspection personnel.
3. Performance Standards and Methods. Describe all performance standards and methods necessary to ensure implementation of the remedial action construction, including mitigation as appropriate, in compliance with ARARs and identified Site-specific performance standards. Performance monitoring requirements shall be stated to demonstrate that best management practices have been implemented for dredging operations, transportation of dredged material, and proper cap placement techniques.
4. Inspection and Verification activities. Establish the observations and tests that will be required to monitor the construction and/or installation of the components of the remedial action. The plan shall include the general scope and frequency of each type of inspection to be conducted. Inspections shall be required to measure compliance with environmental requirements and ensure compliance with all health and safety procedures.

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

5. Documentation. Reporting requirements for CQA activities shall be described in detail in the CQA plan. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation/storage. A description of the provisions for final storage of all records consistent with the requirements of the UAO shall be included.
6. Field Changes. Describe procedures for processing design changes and securing EPA review and approval of such changes to ensure changes conform to performance standards, ARARs, requirements of this SOW, are consistent with Cleanup Objectives and are protective of human health and the environment.
7. Final Reporting. Identify all final CQAP documentation to be submitted to EPA in the Remedial Action Construction Report, or other deliverables and submissions.

Detailed procedures for water quality sampling and analysis described in the CQAP shall be presented in the plans and specifications, as appropriate. Existing EPA-approved (HCC) QAPPs and other supporting documents may be referenced or included, as appropriate.

B. Quality Assurance Project Plans

For a particular sampling event Respondents may propose to use an existing EPA-approved QAPP. The Respondents will identify whether any changes or additions are needed for each sampling effort. Regardless of whether Respondents utilize existing EPA-approved QAPPs or submit a new QAPP for a unique sampling event, the QAPP shall be consistent with the requirements of the EPA Contract Lab Program (CLP) for laboratories proposed outside the CLP. The QAPP shall at a minimum include:

Project Description

- Facility Location History
- Past Data Collection Activity
- Project Scope
- Sample Network Design
- Parameters to be Tested and Frequency
- Project Schedule

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

Project Organization and Responsibility

Data Management Plan

- Describe tracking, sorting, retrieving data
- Identify software for data storage,
- Minimum data requirements & data format
- Data backup procedures
- Submission of data in format(s) acceptable to EPA

Quality Assurance Objective for Measurement Data

- Level of Quality Control Effort
- Accuracy, Precision, and Sensitivity of Analysis
- Completeness, Representativeness and Comparability

Sampling Procedures

- Sample Custody
- Field Specific Custody Procedures
- Laboratory Chain-of-Custody Procedures

Calibration Procedures and Frequency

- Field Instruments/Equipment
- Laboratory Instruments

Analytical Procedures

- Non-contract Laboratory Program Analytical Methods
- Field Screening and Analytical Protocol
- Laboratory Procedures

Internal Quality Control Checks

- Field Measurements
- Laboratory Analysis

Data Reduction, Validation, and Reporting

- Data Reduction
- Data Validation
- Data Reporting

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

Performance System Audits

- Internal Audits of Field Activity
- Internal Laboratory Audit
- External Field Audit
- External Laboratory Audit

Preventative Maintenance

- Routine Preventative Maintenance Procedures and Schedules
- Field Instruments/Equipment
- Laboratory Instruments

Specific Routine Procedures to Assess Data Precision, Accuracy, and Completeness

- Field Measurement Data
- Laboratory Data

Corrective Action

- Sample Collection/Field Measurements
- Laboratory Analysis

Quality Assurance Reports to Management

C. Health and Safety Plan

The Respondents, or their contractors, shall develop and submit in accordance with the schedule in Section V of this SOW, health and safety plans which are designed to protect on-site personnel and area residents from physical, chemical, and all other hazards posed by this remedial action. The safety plan shall develop the performance levels and criteria necessary to address the following areas:

- Facility description
- Personnel
- Levels of protection
- Safe work practices and safeguards
- Medical surveillance
- Personal protective equipment
- Personal hygiene
- Decontamination—personal and equipment

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

Site work zones
Contaminant control
Contingency and emergency planning, including SPCC
Logs, reports, and record keeping

The safety plan(s) shall follow EPA guidance and all OSHA requirements as outlined in 29 C.F.R. 1910 and 1926. Respondents may utilize existing Health and Safety Plan project documents (e.g., pre-remedial design HASP) or other company/contractor HASPs provided that Respondents demonstrate the HASP has been modified, as necessary, or otherwise sufficiently addresses the activities covered by this SOW.

D. Field Sampling Plan

Respondents shall develop and submit in accordance with the schedule in Section V of this SOW, field sampling plan(s) (or equivalent documents/appendices) as described in "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA", October 1988. The Field Sampling Plan(s) will supplement the QAPP and address all sample collection activities under this SOW.

Task 6: Operation, Maintenance & Monitoring

Respondents shall submit in accordance with the schedule in Section V of this SOW for EPA approval a single post-remedial action Operation, Maintenance, & Monitoring Plan (OMMP) covering all remedial actions in the in the Head of Hylebos Waterway Problem Area. The OMMP covers long-term operation, maintenance and monitoring activities after all elements of the remedial actions have been constructed. The objectives of the OMMP shall include:

- Confirmation that performance standards are achieved by the remedial action;
- Confirmation that SQOs are still maintained in areas dredged within the Head of Hylebos Waterway Problem Area;
- Confirmation that exposure of subsurface contamination has not occurred through physical processes such (e.g., through) storms or ship scour;
- Evaluation of the effectiveness of capped areas;
- Confirmation of natural recovery in designated areas within 10 years following completion of remedial actions in adjacent areas;
- Evaluation of long-term effectiveness of source control;
- Evaluation of long-term effectiveness of habitat mitigation; and

The Respondents shall prepare an OMMP to cover both implementation and long-term maintenance and monitoring of the remedial action, including mitigation areas. A draft OMMP shall be submitted with the Draft (90%) Design. The final OMMP shall be submitted to EPA no later than the Remedial Action Work Plan submittal. The final OMMP shall address all comments made to the draft OMMP and will be subject to EPA approval. After results for each monitoring event are reported, the final OMMP will be reviewed and revised as necessary, under EPA direction and approval. Types of monitoring may include:

- bathymetry
- sediment chemistry
- confirmatory biological analyses (i.e., sediment bioassays or benthic infaunal abundance)
- seepage chemistry for specific SMAs
- fish tissue analysis

Respondents shall propose the appropriate monitoring elements necessary to achieve the specified monitoring objectives in this SOW for the remedial action. A rationale for the proposed monitoring actions shall also be included. However, long-term monitoring to ensure the effectiveness of the remedial action, including mitigation, will continue as long as contaminated sediments are left in place.

The OMMP shall be composed of the following elements:

1. Description of normal operation and maintenance:
 - a. Description of tasks to achieve each monitoring objective;
 - b. Description of tasks for maintenance;
 - c. Schedule showing frequency of each OMMP task
 - d. Summary table of OMMP activities for all activities (e.g., Segments 1 and 2; embankments, mitigation, etc.)
2. Description of routine monitoring and laboratory testing:
 - a. Description of monitoring tasks;
 - b. Description of required data collection (including sample type, number, location and frequency), laboratory tests, and their interpretation;
 - c. Required quality assurance and quality control, SAP & HSP (or addenda);
 - d. Schedule of monitoring frequency; and

03/25/02

Head of Hylebos Waterway SOW
CERCLA 10-2002-0065

- e. Description of verification sampling procedures if SQOs or performance standards are exceeded in routing monitoring.
- 3. Corrective Action:
 - a. Description of corrective action to be implemented in the event that cleanup or performance standards are not met (e.g., if exceedances of SQOs are detected, identify additional sampling and/or analysis to be conducted by Respondents to identify appropriate response actions, if any); and
 - b. Schedule for implementing these corrective actions.
 - 4. Description of procedures for a request to EPA to reduce the frequency of or discontinue monitoring.
 - 5. Records and reporting mechanisms required:
 - a. Laboratory records;
 - b. Records for long-term monitoring costs;
 - c. Documentation to comply with CERCLA 5-year Review Reporting Requirements;
 - d. Reports to State or Federal Agencies.

The final OMMP shall include detailed descriptions of all sampling activities, such as groundwater and sediment quality monitoring, and will establish requirements for quality assurance sampling activities including the sampling protocols, sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation. The OMMP shall include sediment sampling operations manual, quality assurance project plans, and health and safety plans for sediment sampling activities. Existing EPA-approved (HCC) QAPPs and other EPA-approved supporting documents may be referenced or included as appropriate.

V. RD/RA SCHEDULE OF DELIVERABLES AND MILESTONES

The schedule of notification to EPA for submission of major deliverables to EPA is described below. If the date of submission of any item or notification required by this SOW occurs on a weekend or federal holiday, the date of submission of that item or notification shall be the next working day following the weekend or holiday.

Item #	Milestone	Description
1.	Remedial Design Work Plan	15 days after UAO effective date
2.	Preliminary (30%) Design for Segments 1 and 2	100 days after effective date of UAO [Note: if it is feasible to initiate remedial action in 2002, Respondents may propose omitting 30% design.]
3.	Draft (90%) Design for Segments 1 and 2, including draft CQAP, draft OMMP, draft BA Addendum, compensatory mitigation plan, outline of plans & specifications	60 days after receipt of EPA comments on 30% design
4.	Final (100%) Design including CQAP, OMMP, BA Addendum, Compensatory Mitigation Plan, draft plans & specifications, and project schedule & cost estimate	45 days after receipt of EPA comments on 90% design
5.	RA Work Plan, including final CQAP, Final OMMP, Plans & specifications and supporting documents	45 days after EPA approval of Final Design
6.	Award RA Construction Contract	NLT 60 days after approval of 100% design and RA work plan
7.	Notification of RA Start	30 days prior to start of construction
8.	Pre-Construction Inspection Meeting	15 days after award
9.	Initiate Construction	NLT 50 days after award

10.	RA Construction	As required in approved RD & RA Work Plans
11.	Prefinal Construction Inspection/Meeting	NLT 30 days after completion of construction
12.	Prefinal Construction Inspection Letter/Report(s)	7 days after prefinal construction inspection for each discrete element of the remedial action
13.	Final Construction Inspections/Meeting	NLT 30 days after completion of work identified each in prefinal construction inspection letter/report
14.	Final Construction Letter/Reports(s)	NLT 30 days after each final inspection/meeting
15.	RA Construction Report	NLT 30 days after last prefinal construction inspection/meeting
16.	RA Completion Report	NLT 30 days after demonstrating Remedial Action Objectives, including SQOs for natural recovery areas, have been attained

Table 1—Sediment Quality Objectives

Chemical	Sediment Quality Objective ^a
Metals (mg/kg dry weight; ppm)	
Antimony	150 ^A
Arsenic	57 ^B
Cadmium	5.1 ^B
Copper	390 ^L
Lead	450 ^B
Mercury	0.59 ^L
Nickel	>140 ^{A,B}
Silver	6.1 ^A
Zinc	410 ^B
Organic Compounds (µg/kg dry weight; ppb)	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAH)	
Naphthalene	5,200 ^L
Acenaphthylene	2,100 ^L
Acenaphthene	1,300 ^{A,B}
Fluorene	500 ^L
Phenanthrene	540 ^L
Anthracene	1,500 ^L
2-Methylnaphthalene	960 ^L
High Molecular Weight PAH (HPAH)	
Fluoranthene	670 ^L
Pyrene	17,000 ^L
Benz[a]anthracene	2,500 ^L
Chrysene	3,300 ^L
Benzo[fluoranthene]	1,600 ^L
Benzo[a]pyrene	2,800 ^L
Indeno[1,2,3-cd]pyrene	3,600 ^L
Dibenz[a,h]anthracene	1,600 ^L
Benzo[ghi]perylene	690 ^L
Chlorinated Organic Compounds	
1,3-Dichlorobenzene	230 ^L
1,4-Dichlorobenzene	720 ^L
1,2-Dichlorobenzene	170 ^{A,L,B}
1,2,4-Trichlorobenzene	110 ^B
Hexachlorobenzene (HCB)	50 ^{L,B}
Total Polychlorinated Biphenyls (PCBs)	
	51 ^A
	22 ^B
	300 [*]
Phthalates	
Dimethyl phthalate	160 ^L
Diethyl phthalate	200 ^B
Di- <i>n</i> -butyl phthalate	1,400 ^{A,L}
Butyl benzyl phthalate	900 ^{A,B}
Bis[2-ethylhexyl]phthalate	1,300 ^B

Table 1—Sediment Quality Objectives (Continued)

Chemical	Sediment Quality Objective ^a
Di- <i>n</i> -octyl phthalate	6,200 ^B
Phenols	
Phenol	420 ^L
2-Methylphenol	63 ^{A,L}
4-Methylphenol	670 ^L
2,4-Dimethylphenol	29 ^L
Pentachlorophenol	360 ^A
Miscellaneous Extractable Compounds	
Benzyl alcohol	73 ^L
Benzoic acid	650 ^{L,B}
Dibenzofuran	540 ^L
Hexachlorobutadiene	11 ^B
N-nitrosodiphenylamine	28 ^B
Volatile Organic Compounds	
Tetrachloroethene	57 ^B
Ethylbenzene	10 ^B
Total xylenes	40 ^B
Pesticides	
p,p'-DDE	9 ^B
p,p'-DDD	16 ^B
p,p'-DDT	34 ^B

^a Lowest apparent effects threshold among amphipod, oyster, and benthic infauna:

- A - amphipod mortality bioassay
- L - oyster larvae abnormality bioassay
- B - benthic infauna
- * - The sediment quality objective for human health was revised in EPA's 1997 ESD to a PCB SQO of 300 ug/kg.

TABLE 2 – Biological Criteria to be used for Hylebos Waterway RD/RA

Bioassay	Negative Control Performance Standard	Reference Sediment Performance Standard	Sediment Quality Standards Interpretation Endpoints (Hylebos RD/RA performance criteria)	Minimum Cleanup Level/SIZ Interpretation Endpoints
Amphipod (M expressed as %)	$M_C < 10\%$	$M_R < 25\%$	$M_T > 25\%$ Absolute and M_T vs M_R SD ($p=.05$)	$M_T - M_R > 30\%$ and M_T vs M_R SD ($p=.05$)
Larval (N expressed as actual counts)	$N_C \div I \geq 0.70$	$N_R \div N_C \geq 0.65$ (per QA/QC guidance)	$N_T/N_C \div N_R/N_C < 0.85$ and N_T/N_C vs N_R/N_C SD ($p=.10$)	$N_T/N_C \div N_R/N_C < 0.70$ and N_T/N_C vs N_R/N_C SD ($p=.10$)
<i>Neantes</i> growth (MIG in mg/ind/d dry)	$M_C < 10\%$ and $MIG \geq 0.72$ mg/ind/d (dry) (or Case By Case)	$MIG_R \div MIG_C \geq 0.80$	$MIG_T/MIG_R < 0.70$ and MIG_T vs MIG_R SD ($p=.05$)	$MIG_T/MIG_R < 0.50$ and MIG_T vs MIG_R SD ($p=.05$)
Microtox	Case By Case	Case By Case (PSDDA, $BLD_R \leq 20\%$)	$ML_T \div ML_R < 0.80$ and ML_T vs ML_R SD ($p=.05$)	No Microtox MCUL criteria are established SQS level hit is valid for 2 hit rule

M = mortality, N = normals, I = initial count, MIG = mean individual growth rate, BLD = blank-corrected light decrease

SD = statistically different, NOCN = no other conditions necessary, N/A = not applicable

Subscripts: R = reference sediment, C = negative control, T = test sediment

DRAFT SMS EVALUATION ENDPOINTS (BIOASSAYS), Ecology 6/25/98

Figure 1: Segments 1 and 2 of Hylebos Waterway, August 2000 ESD

